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Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "Aerosol optical properties as observed from an ultralight aircraft over the Strait of Gibraltar" *by* Patrick Chazette

**Anonymous Referee #2**

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The manuscript analyzes the properties of aerosol over Gibraltar, derived from observations of elastic backscatter lidar, installed on an ultra-light aircraft, and from the coastal site Raman lidar. The manuscript is clearly and well written and can be published after some minor revisions. 1. Equations should be numbered. 2. P.5 ln8. The equation is formally correct, but reader can be confused, because author first writes "N2-Raman wavelength ðİIJĘðİŚĚ" and later "the ground-based lidar ðİIJĘðİŚĚ=ðİIJĘðİŘÿ,". The reference for original work of Ansmann et al., 1992 should be provided. 3. P.10 ln 21. "the range of LR values found in the literature for dusts is quite wide, ranging from 28 sr (Soupiona et al., 2019) to 80 sr (Papayannis et al., 2008)." Lidar ratio of dust at 355 nm strongly depends on the imaginary part (Im) of the refractive index. (e.g. https://doi.org/10.5194/acp-2020-98). So low values of LR



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Discussion paper

observed in this work may indicate to low Im in UV. 4. P.20 ln 3. “Saharan aerosols would have a LR of less than 34 sr.” I think this LR is too low for dust. It can be due to mixing with with maritime particles. 5. Conclusion. P.20 ln 9. “Using the CALIOP classification in the context of this work, polluted dusts should be classified with LR $\sim$45 sr and Saharan dusts with LR less than 34 sr for the wavelength of 355 nm.” I think this statement is unsupported. There are numerous Raman lidar measurements in Africa (e.g. SAMUM, SHADOW experiments), bringing LR at 355 nm well above 40 sr.

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